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Using the Initial Teaching Alphabet to Improve Articulation. Final Report.

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Twenty-four preschool children (aged 3-3 to 5-6) were studied to test the efficacy of newly developed phonemic-visual-oral materials in the correction of articulatory problems. All subjects were given an articulation test and a battery of five tests to measure auditory memory span and intelligence. Twelve children received 50 sessions of instruction, 1 hour long, using the new materials based on the Initial Teaching Alphabet and structured to cover auditory discrimination, sound sequencing, visual discrimination, phonemic synthesis and analysis, and rhyming. A control group of 12 was exposed to traditional articulation therapy procedure. The experimental group made significantly fewer errors in articulation after therapy than the control group based on the Goldman-Fristoe Filmstrip Articulation Test ($p=.05$). No significant difference was found between groups in auditory memory skills and intelligence scores. Conclusions were that the experimental, visual-symbol approach has great potential in the modification of misarticulation. (RP)

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USING THE INITIAL TEACHING ALPHABET TO IMPROVE ARTICULATION

January 1968

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HEALTH, EDUCATION, AND WELFARE
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Using the Initial Teaching Alphabet to Improve Articulation

Project No. D6 1722
Grant No. G2 3252 0450 6011

Ronald Goldman, Ph.D.

January 1968

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USING THE INITIAL TEACHING ALPHABET TO IMPROVE ARTICULATION

INTRODUCTION

The normal child must cope socially and emotionally with new situations and challenges in order to take full advantage of the school learning experience. The youngster who enters school with an articulatory deficit must face additional obstacles in making this adjustment--obstacles which may well retard both his educational achievement as well as his social adjustment. It would therefore be highly desirable to provide these children with maximum opportunity to perfect their articulatory skills prior to school entrance. This point has been emphasized as being mandatory particularly in the management of culturally disadvantaged children. Raph (1967) recently stated that while children of disadvantaged minority groups have formerly not been brought to the attention of the psychologists or speech pathologists prior to school entrance, once in school their language deficiencies have imposed a problem of such severity and magnitude as to render ineffective whatever special services the school might provide in dealing with their needs. For deaf children and brain damaged children, the necessity of early treatment is generally accepted. The need for early identification and remedial programs for these individuals ~~are~~ is considered mandatory. The articulatory defective child, however, is not given the same consideration.

Approximately 7% of school age children exhibit problems of misarticulation. The highest incidence of this disorder occurs in children in the kindergarten and primary grades. There also appears to be a sharp increase in articulatory maturation during the first two school years. This observation has provided the rationale for the widely adhered-to policy of postponing early therapeutic management for young children with misarticulations. Consequently, it is quite common to find public school speech therapy programs giving a low priority status to articulatory defective children in the kindergarten, first and second grades.

There has been some question as to why children increase in articulatory proficiency in the seventh and eighth year of life. Some writers have suggested that this improvement is the result of maturation of physiological and auditory skills. One area, however, that has not been subjected to thorough investigation is the role of reading readiness training and early reading experiences in facilitating this articulatory maturation. It is conceivable that the intensive auditory training and phonic orientation that the child receives during his introduction to reading may be significant factors in explaining the increased momentum in his acquisition of mature patterns.

It is the contention of the principal investigator that speech therapy for preschool and primary grade children has been delayed due to the procedural limitations of our therapy

programs for immature children. At present, the speech therapy approaches must rely primarily on the auditory channel as the main avenue of stimulation and this form of stimulation is relatively abstract and frequently ineffective for the preschooler.

The methods of remediation, to be successful, must be carefully formulated to best meet the needs and abilities of the child. A child with a speech disorder in the form of articulatory inadequacy is faced with various difficulties in modifying his inadequate speech behavior. He must first of all, learn to produce correctly the phonemes of the language and then to be knowledgeable in the proper placement of these sounds within words, sentences, and finally general conversation. A child who presents a speech pattern substituting the sound t for k must not only learn how to produce the proper phoneme, but must then know where and when to produce it. For example, a child saying the word tat for cat not only must learn to articulate k correctly, but in addition, must learn that it exists at the beginning of the word cat. Correct word production, therefore, would be dependent upon correct phoneme order as well as correct k articulation, otherwise the resulting verbal products could be the words, act, or tack as well as cat. To learn these skills, the present techniques necessitate auditory training as a primary vehicle for speech modification. The value of the auditory avenue of stimulation, however, is not being minimized or questioned. Its effectiveness has been demonstrated, but its

limitations growing out of the abstract quality inherent in auditory stimulation are obvious. Using only the auditory channel, the child must take in phonemic information, store it within the central nervous system and then be prepared to recall it accurately when verbalizing. Some of this abstractness could be reduced if a set of visual symbols relating in a one-to-one fashion to the phonemic elements of speech, easy for the preschooler to learn, was available. The unavailability of a set of visual-verbal symbols has limited the application of a truly multi-sensory approach to articulation training for preschool children. The lack of suitable visual symbols may also explain the basis for frequently delaying therapeutic management until the child has attained some basic reading and phonic skills. The authors feel that a phonemic-visual-oral association approach could add a degree of concreteness to therapy that cannot be equalled in reinforcement by any single sensory channel. Current articulation therapy approaches, such as the program suggested by Van Riper (1963) rely heavily on the association of auditory and kinesthetic experiences. This pairing, however vital to the acquisition of normal speech, represents a complex of vague associations which many children are not capable of or have difficulty in adequately learning.

The relationship between articulation disorders and reading disabilities has frequently been reported. The findings of Monroe (1932), Eames (1950), Jones (1951) and others have led to the general conclusion that there may be some

common denominator between articulation disorders and reading disabilities. The nature of this relationship is still undefined. It is generally agreed, however, that speech sound discrimination, auditory memory span, auditory acuity and vocal phonics are necessary components in the acquisition of both speech and reading skills. Experts in both speech pathology and reading disorders indicate that deficiencies in these auditory functions may retard the development of either one or both modes of functioning. In strengthening either articulation or reading skills, one might logically predict an improvement in the other area.

There seems to be sufficient theoretical and research evidence to justify an investigation of the effects of associating visual symbols and their phonemic correlates in articulation therapy. Traditional orthography with its irregularities and inconsistencies does not lend itself in relating phonemic events to visual symbols for young children. This symbol system often promotes confusion in both young children as well as some adults. A visual-symbol system which would relate in a one-to-one fashion to the phonemic elements of speech, avoiding spelling inconsistencies, while still closely relating with traditional orthography would seem to be extremely valuable as a vehicle in articulation therapy. The initial teaching alphabet (i.t.a.) seems to provide the basic ingredients for this type of articulation training. i.t.a, introduced in England by Sir James

Pitman, consists of a repertoire of 44 visual symbols, each representing essentially a single phonemic element and each having a strong similarity of form (especially in the upper half of the symbol) to traditional orthography. In addition, the English educators have been sufficiently impressed with the results yielded by i.t.a. to incorporate this alphabet into their school system. They have reported results with the use of this alphabet which seems to indicate a superiority in teaching reading skills as compared with the use of traditional orthography. This success is evident not only in school age children, but also in children of three to five years of age from lower socio-economic backgrounds. It is interesting to note, however, that although there has been a great deal of work carried out on the use of i.t.a. in many reading programs in this country, there has been no systematic incorporation of a phonetic alphabet of this type into speech therapy programs designed for preschool children with articulation errors.

A major function of this grant was to devise a program which would demonstrate the feasibility of using i.t.a. symbols as an adjunct to traditional speech therapy procedures with preschool articulatory defective children. The initial focus of this program, therefore, was the development of an approach which would aid in strengthening the association between phonemic events and their visual and kinesthetic correlates. Such associations would then provide the articulatory defective child with a basis for multi-sensory

attack mode in the establishment of correct articulatory patterns.

Materials

To test the efficacy of this phonemic-visual-oral approach, the development of a rudimentary set of teaching materials was required. Speech therapy materials were developed and structured to cover five major areas of training: auditory discrimination, sound sequencing, visual discrimination, phonemic systhesis and phonemic analysis and rhyming. This program commences with the presentation of a single sound and its corresponding i.t.a. symbol and progresses systematically through all of the symbols. Synthesis of the elements into syllables, words, sentences and stories is therefore carefully structured. The program is graded in difficulty so that the materials are presented in a controlled manner allowing the child to start at a level at which he can function successfully and progress through more difficult stages of articulation. New materials and sounds are programmed into the lessons at the rate at which a child can learn and incorporate the sounds. Basically, the child is trained to be aware of the function of phonemes within speech so that he can analyze and synthesize these sounds properly into his general conversational speech. The visual modality incorporating i.t.a. symbols serves as the major form of stimulation used to facilitate this training.

Materials included in this articulation training program

are: 1) a therapist's manual defining the general philosophy of the experimental approach and 54 programmed therapy lessons (see Lessons for Speech Pathologists), 2) 38 stories devised to identify and characterize each of the i.t.a. symbols employed (see Lessons for Speech Pathologists), 3) five filmstrips illustrating the 38 stories, giving character to the i.t.a. symbols (see accompanying filmstrips), 4) a series of programmed workbooks to be used by the children at home (see Child's Workbook and Index), 5) a parent's index describing the activities to be carried out with their children at home (see Child's Workbook and Index), 6) materials to accompany lessons for speech pathologists (see Appendix G; two sets of the actual materials have been sent to the U.S. Office of Education. The kits would include those materials listed in the Appendix.)

The lessons for the speech pathologist were developed for group therapy presentation, but will readily lend themselves to modification for use in individual therapy. The following section describes some of the general activities that were programmed into the lessons and workbooks.

Areas of Training

The first area, visual discrimination, is structured in such a manner as to train a child in gross visual discrimination and then to progress to finer discrimination tasks in order to differentiate among the visual symbols of the i.t.a. system. The child first works with pictures and geometric designs and then advances to matching and comparing letters

of the alphabet which involve fine visual discriminations.

The second major training area emphasizes development of auditory discrimination. The activities employed for this function progress from gross auditory discriminations, such as differentiating between a bell and a drum, to fine discriminations requiring differentiation among similar phonemes. The visual and auditory channels are stimulated concurrently in these activities so that the child does not have to rely completely upon his auditory modality alone to make these discriminations.

The third area involves training in sound sequencing. Early phases of this work requires the child to imitate and reproduce sequences of sound, such as those produced by a drum and triangle, a series of drum beats, clapping and other gross sound sequencing activities. Subsequently, the child is asked to imitate sequences of phonemes and retain them in correct sequential order in order to improve auditory memory. Sound sequencing activities are included in each of the programmed units because of the relative importance that this area seems to bear in learning correct articulation. The more concrete visual stimuli seem to substantially reinforce the child's ability to correctly sequence phonemes and facilitate auditory memory.

The fourth area of training comprises activities designed to train phonemic synthesis and analysis. The child is trained to blend individual phonemes to produce whole word configurations. He is trained to understand the relationship between

the word and its component parts in order to make closure to achieve the whole word concept. The use of i.t.a. symbols has a distinct advantage in aiding the process of synthesizing, since it provides a phonemically consistent visual system which reinforces and facilitates auditory memory.

The training in phonemic analysis commences with the identification and oral production of phonemes in words and progresses toward the synthesizing of phonemes so that the child becomes more cognizant of individual phonemes inherent within speech stimuli.

Finally, the concept of rhyming is programmed into this approach in order to train the child in word structure and the similarity between and among words.

In summary, the activities comprising this program were devised to train the child in visual discrimination, auditory discrimination, sound sequencing, phonemic synthesis and analysis and rhyming. The program provides for a high degree of sound stimulation through interesting and colorful program materials. The preschool children can be stimulated via visual, auditory and kinesthetic channels in order to reinforce the learning, discrimination, and sound sequencing of defective phonemes. The process is analytical in nature and depends heavily on auditory training and concurrent oral production utilizing the i.t.a. symbols as a primary vehicle of learning. This approach seemed to offer some possible aid to speech pathologists working with preschool children with severely defective articulation.

METHOD

Pilot Investigation

In order to study the feasibility of the materials developed, a pilot study was designed to investigate the effectiveness of this approach in the training of preschool articulatory defective children. A total of 24 children was derived from the diagnostic and therapeutic resources of the clinical program of The Bill Wilkerson Hearing and Speech Center. The criteria for subject selection included: 1) chronological age between three years three months and five years six months, 2) presence of a functional articulation disorder which was defined as a defect in articulation with no apparent organic basis, along with no apparent abnormalities in language or visual-motor perception, and 3) an articulation problem which was classified as moderate or severe as defined by articulatory performance on the Goldman-Fristoe Filmstrip Articulation Test (1967).

The subjects selected were randomly divided into two groups. Twelve children were placed into the experimental group to undergo the newly developed experimental treatment procedure, while an equal number of subjects were assigned to serve as the control group to be exposed to a traditional articulation therapy procedure similar to the training program outlined by Charles Van Riper (1963). These two treatment groups were further subdivided according to the degree of severity of articulation

problem into two groups consisting of children with moderate and children with severe speech defects.

Prior to the initiation of the experimental and control treatments, all subjects were carefully assessed for their articulatory abilities. This was accomplished by the use of the Goldman-Fristoe Filmstrip Articulation Test. In addition, all subjects were exposed to a battery of five tests to measure auditory memory span and to determine intelligence. Auditory memory span was evaluated by the use of the digit span and sentence test obtained from the revised Stanford Binet Scale, Form L.

Three measures of intelligence were also included in this battery; two were non-verbal measures and one was a verbal test. The tests employed were the Goodenough Draw-A-Man Test, the Geometric Form Drawings, and the Peabody Picture Vocabulary Test. The data obtained prior to therapy for both the experimental and control groups can be seen in Tables 1 and 3.

The experimental and control groups were exposed to an equal number of therapy sessions. They were seen for approximately 50 one hour sessions. These sessions were of a group therapy design in which six children participated.

The speech pathologists participating in this project were chosen on the basis of their competence as speech clinicians by virtue of both their training and experience. These individuals had been experienced in traditional therapeutic

approaches and had the skill and sensitivity necessary for adapting to the new experimental procedure as well as the control treatment.

RESULTS

The main function of this study was to compare the experimental and control articulation therapy treatments in terms of their effectiveness in changing inadequate articulatory skill in young children. This measurement was achieved by comparing the change in the number of articulatory errors that occurred between the time the program was first initiated with the results obtained when the experiment was terminated. (See Table 1) The differences in the change in the number of articulatory errors that occurred following therapy were calculated for both the experimental and control groups. The comparison of these difference scores can be found in Table 2.

The resulting scores on the measures employed to assess auditory memory span and intelligence obtained on the children, both prior to the investigation and at its termination can be found in Tables 3 and 4. The results of this general assessment failed to reveal significant changes in score following either the experimental or the control treatments.

TABLE 1

AVERAGE NUMBER OF ARTICULATION ERRORS
FOUND IN THE EXPERIMENTAL AND CONTROL GROUPS
PRIOR TO AND FOLLOWING EXPERIMENT

Group	Average Number of Articulation Errors Prior to Experiment	Average Number of Articulation Errors Following Experiment
i.t.a. (experimental)	49.08	23.50
moderate	41.33	21.00
severe	56.83	26.00
traditional (control)	45.80	29.50
moderate	42.22	33.00
severe	49.40	26.00

TABLE 2

MEAN REDUCTION IN ARTICULATION ERRORS AS OBSERVED IN THE CHILDREN UNDERGOING ITA AND TRADITIONAL THERAPEUTIC PROCEDURES

Group	Mean Reduction	Standard Deviation	t
Severe Articulatory Defectives			
i.t.a.	30.83		
traditional	23.40		
Moderate Articulatory Defectives			
i.t.a.	20.33		
traditional	9.20		
Moderate and Severe Combined			
i.t.a.	25.58	10.92	2.20*
traditional	16.30	7.94	

*Significant at the 5% level of confidence.

TABLE 3

A COMPARISON OF THE PRE AND POST THERAPY MEAN SCORES OBTAINED BY THE CONTROL GROUP SUBJECTS ON FIVE TESTS

Test	Mean Score		Difference	t	P
	Pre Therapy	Post Therapy			
Memory Span					
Digit	4.11	3.67	.45	.275	>.70
Sentence	3.33	3.56	.23	.024	>.90
Peabody Picture Vocabulary Test	102.44	104.67	2.23	.430	>.60
Goodenough Draw-A-Man Test	8.78	10.33	1.55	.951	>.30
Geometric Forms	4.33	5.22	.89	.668	>.50

TABLE 4

A COMPARISON OF THE PRE AND POST THERAPY MEAN SCORES OBTAINED BY THE CONTROL GROUP SUBJECTS ON FIVE TESTS

Test	Mean Score: Pre Therapy	Mean Score: Post Therapy	Difference	t	P
Memory Span					
Digit	4.00	4.54	.54	.392	>.60
Sentence	3.58	4.00	.42	.561	>.50
Peabody Picture Vocabulary Test	108.92	102.83	6.09	1.225	>.20
Goodenough Draw-A-Man Test	8.36	11.00	2.64	1.949	>.05
Geometric Forms	4.79	5.91	1.12	.282	>.70

DISCUSSION

In general, the following preliminary findings have been supportive of the value of the experimental approach in the following respects:

A) A greater degree of improvement as measured by performance on the Goldman-Fristoe Filmstrip Articulation Test was observed in the experimental group. When pre-therapy articulation test results were compared with post treatment measurements, it was found that the children in the phonemic visual-oral program showed a mean reduction of 25.58 in the number of articulatory errors recorded, while the children in the control group exhibited a mean reduction of only 16.30 errors. (The number of errors was computed on the basis of phoneme and position in words--for example, defective production of the /k/ phoneme in initial, medial and final positions would count as three articulatory errors.) The difference between the two means was subjected to analysis and the difference was found to be statistically significant at the 5% level of confidence.

B) The children in the experimental group learned the visual symbols and related them to their phonemic correlates with great speed and facility. They are now consistent in saying the correct phonemes in word and sentence context when stimulated by the visual symbols.

C) Greater interest on the part of the children has been observed in response to the phonemic visual-oral program. This interest has been manifested by a higher degree of regularity in attendance and responsiveness within the group sessions.

D) Children in the experimental group have exhibited longer attention spans and minimal occurrences of hyperactivity and distractability.

E) The parents of the experimental children have shown greater interest and consistency in carrying out the assignments in the home program.

F) In the analysis of change that occurred between the pre and post measurements for auditory memory skills and intelligence scores, no statistically significant differences were obtained. Neither the control group nor the experimental group revealed significant gains in the test scores following speech therapy.

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The results of the present study suggest the potential value of a phonemic alphabet in articulation therapy for four and five year old children. This experimental approach which relys heavily on the use of a visual-symbol system similar to the Initial Teaching Alphabet has the potential of greatly

aiding in the modification of misarticulation. On the basis of the preliminary data obtained, this experimental technique seemed to be responsible for a larger number of corrections of misarticulation than was obtained with an approach based on auditory training as the primary vehicle of modification. The effects of this procedure with children exhibiting strong visual abilities would probably be greater than those obtained from auditory training alone. The culturally disadvantaged child, who usually exhibits poor auditory function with relatively stronger visual skills, might respond better to this type of articulation approach. It must be pointed out, however, that additional data is necessary before generalizations can be made. In view of the present findings and the subjective feelings of the investigators, it would be necessary to test this technique on larger populations, over a longer time interval, imposing more stringent controls in order to strengthen and verify the data obtained on the present pilot investigation.

SUMMARY

The purpose of this project was to refine some previously developed materials as well as devise new teaching materials for the purpose of demonstrating the application of a visual-sound-symbol system to articulation training in a preschool population. In addition, a pilot study was carried out to compare this experimental articulation therapy procedure with a

more traditional approach based primarily on auditory training for preschool children.

The materials developed for this project were geared to train the articulatory defective preschooler in auditory discriminations, sound sequencing, phonemic synthesis and analysis and rhyming. Programmed learning techniques were utilized in order to present these areas to the articulatory defective children. In order to reinforce the activities carried out by the speech pathologist, a programmed series of workbooks were devised to correspond with the therapy lessons developed by the investigators.

The program therefore consisted of activities in lesson form to be carried out by the individual therapists, and the home program that the parents would employ to reinforce the activities undertaken in therapy.

Following the development of the materials, a preliminary investigation was carried out with a group of preschool articulatory defective children. A total of 24 children were included; 12 children were given the experimental procedure, while another group of 12 received a traditional articulation therapy program, with main emphasis on auditory training. Approximately 50 one hour sessions were completed for each of these groups. The preliminary findings of this project revealed a greater degree of articulatory improvement in the experimental group as measured by the Goldman-Fristoe Articulation Test. The children in the experimental group corrected ten more phonemes than did the

children undergoing traditional articulation procedures. This difference was significant at the 5% level of confidence. It must be pointed out, however, that no significant change was found in auditory memory or intelligence scores as a function of the experimental and control procedures.

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A P P E N D I X E S

Appendix A	Picture Cards
Appendix B	Word Cards
Appendix C	Film Strips
Appendix D	Sound Activity Material
Appendix E	Sentence Strips
Appendix F	Cardboard Character Pictures
Appendix G	Miscellaneous

APPENDIX A

Picture Cards* (146)

	(p)
1	pig
1a+	pig
2	penny
2a	penny
3	puppy
4	pipe
5	pie
6	paper
7	pencil
8	pony
9	pillow

	(f)
10	fan
11	fish
12	feet
13	fence
14	face
15	farm
16	phone
17	fire
18	fishing
19	five

	(m)
20	mop
21	moon
22	man
23	mice
24	mouse
25	milk
25a	milk
26	meat
27	mud
28	monkey

	(b)
29	bee
30	boy
30a	boy

	(b)
31	bike
32	boat
33	boot
34	bow
35	baby
36	bat
37	bees
38	buggy
39	bug
40	book
41	back
42	ball
43	bell
44	bird

	(t)
45	tub
46	tie
46a	tie
47	toy
48	toe
49	two
50	time
51	town
52	tire
53	teacher

	(s)
54	sat
55	soup
56	seat
57	see
58	soap
59	seesaw
60	suit
61	sun
62	stove
63	seven

	(z)
64	zoo
65	zebra

	(g)
66	gum
67	goose
68	gate
69	gun
70	goat
71	girl
72	glove

	(d)
73	door
73a	door
74	doll
75	dog
76	duck
77	dollar
78	dish
79	dig

	(n)
80	nose
81	night
81a	night
82	nurse
83	knife
84	number

	(c)
85	car
86	cow
87	can
88	cat
89	cap
90	coat
91	cup
92	candy

	(c)
93	cave
94	curl
95	coffee
96	calf
97	kitchen

	(h)
98	hat
98a	hat
99	house
100	hill
101	head
102	horse
103	hammer

	(l)
104	light
105	leaf
106	lamp
107	laugh
108	leg
109	letter

	(v)
110	vine
111	vest
112	vase
113	violet
114	valentine

	(sh)
115	shoe
116	shovel
117	show
118	shell
119	ship

*On the back of these pictures you will find a number which refers to the corresponding word card.

+All pictures with an (a) listing are either identical or similar to the picture preceeding.

Picture Cards (146)

	(r)
120	run
121	reel
122	rain
123	rack
124	red
125	rope
126	rabbit

	(ch)
127	church
128	chicken
129	choo-choo
130	check
131	cheese

	(w)
132	web
133	wig
134	wagon
135	window
136	well
137	washing
138	watch
139	witch

	(j)
140	jacket
141	jar

	(vowels)
142	apple
143	elephant
144	eggs
145	eyes
146	owl

APPENDIX B

Word Cards* (199)

B1 bɔi
2 bɛɛ
3 bœ
4 bɷ
5 bie
6 bɛɛt
7 bœt
8 bɛɛz
9 bat
10 but
11 bug
12 bud
13 bun
14 bus
15 bel
16 bœl
17 bɷc
18 baul
19 bæbɛɛ
20 bɷt

C1 cœl
2 cɷc
3 cɷd
4 cɷcɛɛ
5 caul
6 cou
7 cat
8 cœt
9 cær
10 caufɛɛ
11 caʃh

D1 dig
2 dot
3 diʃh
4 daʃh

F1 fɛɛt
2 fæs
3 fœm
4 fæm
5 fæ
F6 fɛɛ
7 fie
8 fœ
9 fɷ
10 fɔi
11 fat
12 fast
13 fel
14 fɷl
15 fɷt
16 faul
17 fan
18 fens
19 fœn
20 fiev
21 fiʃh

G1 gɷd
2 gæt
3 gɷs
4 gœt

H1 haz
2 hand
3 hat
4 had
5 hop
6 hɛɛ
7 hiz
8 hœl
9 hil
10 hɷc
11 hɷd
12 haug
13 hous
14 hed

L1 liet
2 lɛɛf
3 let
4 lœf
5 laf
6 læc
L7 loc
8 lam
9 lip
10 leg
11 lɷc
12 laug
13 lɷc
14 lamp

M1 mɛɛ
2 mie
3 mœt
4 mat
5 munɛɛ
6 muf
7 mɛɛl
8 mous
9 mop
10 mies
11 mɛɛt
12 milc
13 mud
14 mæ
15 mɷ

N1 nief
2 niet

P1 pæs
2 pigz
3 pas
4 past
5 pup
6 pupɛɛ
7 pɷl
8 pɷt
9 pïep
10 pie
11 pig
12 penɛɛ
13 pœnɛɛ
14 pœp

*On the back of these word cards you will find a number which refers to the corresponding picture card.

S1 sɛɛ
2 sie
3 sæ
4 sœ
5 sɷ
6 sɷt
7 siet
8 sɛɛt
9 sœp
10 sæf
11 sat
12 sun
13 sel
14 sæl
15 smaul
16 sau
17 sɷp
18 sɛɛsau
19 saʃh
20 sunz
21 stœv

SH1 ʃip
2 ʃhɷ
3 ʃhɛɛt
4 ʃhæv
5 ʃhɛɛp
6 ʃhot
7 ʃhɷt
8 ʃhɛɛ
9 ʃhut

T1 tɛɛ
2 tɔi
3 tɷ
4 tœ
5 tie
6 tun
7 tuf
8 tɷc
9 taul
10 toun
11 tiem

TH1 ȶhu

V1 vien
2 vest
3 væs

W1 woz
2 wɷd
3 wɷl
4 waul
5 wauc
6 wig
7 wiʃh
8 woʃh
9 wel

Vowels
X1 ɔiŋc
2 ɔil
3 ies
4 iz
5 ɛɛz
6 æs
7 ɔif
8 æf
9 ɛɛf
10 ief
11 œf
12 ɷf
13 ɛɛzɛɛ
14 iez
15 az
16 ɔul
17 æ
18 and
19 it
20 in
21 an
22 am
23 ie
24 az
25 apl

Z1 zɷ

APPENDIX C

Stories on Film Strips

Film Strip 1

1 P. Mooney Introduction
2 Pete Pooch
3 Eli Eel
4 Fanny Fish
5 Oopie Oops
6 Molly Moth
7 Oily Oink
8 Oh Yes, Oh No

Film Strip 2

9 Beep, Beep & Boop
10 Ada Ape
11 Tillie Tiptoes
12 Ispy
13 Sue Sour
14 Ikie Imp
15 Zoo Zoof
16 Agee Applebee

Film Strip 3

17 Go-Go
18 Dan Diver
19 Will Wink
20 Ethel Egghead
21 No No
22 Uncle Up
23 Candy Cane
24 Happy Heart

Film Strip 4

25 Ollie Olive
26 Loopty Loop
27 Ooky Ook
28 Vitamin Vine
29 Off and On
30 This and That
31 Shaggie Shoes

Film Strip 5

32 Ow Owl
33 U Uke
34 Road Runner
35 Charlie Cherry
36 Jumbled Jane
37 Thumbless Thelma
38 Eng Engle

APPENDIX D

Individual Sound Activity Material* (24 Packages)

SA1	Ballet Shoes
SA2	Bananas
SA3	Butterflies
SA4	Clothes
SA5	Eggs
SA6	Flashcards
SA7	Flowers
SA8	Food
SA9	Footprints
SA10	Hats
SA11	Ice Cream Cones
SA12	Keys
SA13	Kites
SA14	Lemons
SA15	Lions and Patches
SA16	Money
SA17	Olives
SA18	Shoes

Sound Sequencing Material+

SS1	Badges
SS2	Bananas
SS3	Birds
SS4	Butterflies
SS5	Flower Poster, Bugs and Butterflies
SS6	Geometric Shapes

*There is one phoneme written on each article. All 37 phonemes, however, are included within each package.

+There are two or more phonemes written on each article.

APPENDIX E

Sentence Strips (113)

1 ie sɛɛ æ tω

2 ie sɛɛ æ bœt

3 ie sɛɛ æ tœ

4 ie sɛɛ æ piep

5 ie sɛɛ æ bɔi

6 ie sɛɛ æ tɔi

7 ie sɛɛ æ tie

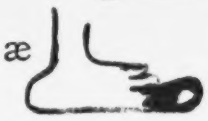
8 ie sɛɛ æ

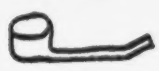
9 ie sɛɛ æ

10 ie sɛɛ æ

11 ie sɛɛ æ bωt

12 ie sɛɛ æ

13 ie sɛɛ æ 

14 ie sɛɛ æ 

15 ie sɛɛ æ

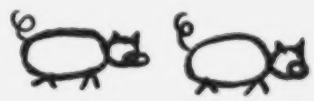
16 ie sɛɛ æ

17 ie sɛɛ æ

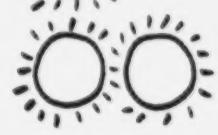
18 sɛɛ mie bɛɛ

19 mie bɛɛ iz big

20 ie sɛɛ wun

21 ie sɛɛ tω 

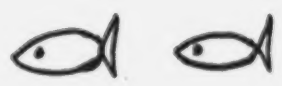
22 ie sɛɛ wun

23 ie sɛɛ tω 

24 ie sɛɛ wun

25 ie sɛɛ tω

26 ie sɛɛ wun

27 ie sɛɛ tω 

28 ie sɛɛ æ pig

29 it iz mie pig

30 it iz æ big pig

31 mie pig gœz zig zag

32 ie gœ zig zag

33 mie gωz gœz zig zag

34 mie gœt gœz zig zag

35 mie næm iz ben

36 ie am æ man

37 ie sɛɛ æ nœt

38 it iz æ

39 daniz in mie band tω

40 it iz æ big band

41 it iz mie cat

42 ie sɛɛ æ cat

43 it iz æ fat cat

44 sɛɛ it gœ up æ fens

45 cum tω mɛɛ cat

46 ben iz æ bœi

47 hɛɛ iz sic

48 hɛɛ iz in bed

49 hɛɛ haz æ hedæc

50 bob iz æ bœi

51 hɛɛ iz æ big bœi

52 hɛɛ iz nies tω mɛɛ

53 hɛɛ nœz ben

54 hɛɛ iz nies tω ben tω:

55 lωc at mɛɛ

56 ie am an ɛɛl

57 mie næm iz ɛɛlie ɛɛl

58 ie liv in æ sɛɛ

59 ben iz æ big bœi

60 bob iz æ bæbɛɛ bœi

61 ie sɛɛ æ pɛɛnɛɛ

62 bob haz æ pensul

63 ie wont æ pupɛɛ

64 wil haz æ wagun

65 sω can not fiend æ nief

66 ie fel on æ hil

67 mie blac cat iz hot

68 hɛɛ had æ bad cœld

69 folœ mɛɛ

70 hɛɛ iz silɛɛ

71 hɛɛ læd on æ lɛɛf

72 lωc at mɛɛ

73 lωc at us

74 hɛɛ iz nies

75 cis mɛɛ

76 ie sɛɛ æ vien

77 ie sɛɛ æ væs

78 ie sɛɛ æ stœv

79 ie sɛɛ æ fiev

80 ie sɛɛ æ seven

81 ie sɛɛ æ cær

82 mie vien iz big

83 giv mɛɛ æ stœv

84 ie hav fiev mies

85 ie am not fiev

86 ie am seven

87 hav æ cωcɛɛ

88 ie liv in æ hœm

89 mωv up æ step

90 bob and paul went for
æ wauc bie tom'z pond

91 bob and paul sau tom sɛɛted on æ laug

92 hɛɛ had caut fiev

93 bob, paul and tom caut aul fiev and ate ʃhem

94 ʃhu cæc iz in ʃhu bocs

95 ʃhœz boiz liec tω ɛɛt cæc

96 ʃhæ ɛɛt cæc at hœm

97 ʃhæ ɛɛt cæc at plæ

98 dω yω liec cæc

99 sɛɛ ʃhu ʃhip

100 ʃhœ mɛɛ ʃhu ʃhɛɛt

101 ʃhut ʃhu windœ

102 ʃhien ʃhu ʃhωz

103 lωc at dadɛɛ ʃhær

104 ie sɛɛ æ mous

105 hɛɛ iz on ʃhu hous

106 hɛɛ iz æ big mous

107 ʃhu cat sau ʃhu mous

108 ʃhu mous iz gon

Single Words on Sentence Strips

109	man	man	man	can
110	big	pig	big	big
111	fat	fat	fat	cat
112	bœt	bœt	bωt	bœt
113	tie	tie	tœ	tie

APPENDIX F

Cardboard Character Pictures (38)

1 P. Mooney
2 Pete Pooch
3 Eli Eel
4 Fanny Fish
5 Oopy Oops
6 Molly Moth
7 Oily Oink
8 Oh Yes, Oh No
9 Beep, Beep and Boop
10 Ada Ape
11 Tillie Tiptoes
12 Ispy
13 Sue Sour
14 Iky Imp
15 Zoo Zoof
16 Agee Applebee
17 Go-Go
18 Dan Diver
19 Will Wink
20 Ethel Egghead
21 No No
22 Uncle Up
23 Candy Cane
24 Happy Heart
25 Ollie Olive
26 Loopty Loop
27 Ooky Ook
28 Vitamin Vine
29 Off and On
30 This and That
31 Shaggie Shoes
32 Ow Owl
33 U. Uke
34 Road Runner
35 Charlie Cherry
36 Jumbled Jane
37 Thumbless Thelma
38 Ing Ingle

APPENDIX G

Miscellaneous (10)

P. Mooney Bag

P. Mooney Stick

Stamp Kit

Stencil Sets No. 1, 2, 3a, 3b, 3c

Felt Sounds

Spinner Game

Children's Workbook and Index

Lessons for Speech Pathologists (54)